

**RYAN
SC**

SERVICE MANUAL

**DISSASSEMBLY
PROCEDURE**

PARTS LIST

Service Manual
RYAN S-C CABIN
manufactured by
RYAN AERONAUTICAL CO.
San Diego, California

RYAN S.C. CABIN PLANE

PREFACE

Each Ryan airplane is completed, carefully inspected, test flown and reinspected at the factory before delivery.

In the preparation of this manual we have endeavored to cover all items generally required in properly servicing and maintaining your airplane. We will appreciate your writing to our Service Department who will supply you with any further information you may desire.

We carry a complete stock of spare parts, and orders for parts can ordinarily be filled and shipped the same day they are received.

The Ryan Aeronautical Company reserves the right to change or modify from time to time the construction of Ryan airplanes or any part thereof as they see fit without incurring any obligation to make like changes on airplanes which have previously been sold.

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GENERAL MAINTENANCE

The airplane and engine should be kept clean both inside and out. Dirt and other foreign matter is not only unsightly but may be injurious to the materials if allowed to accumulate.

Access to the rear section of the fuselage is accomplished by removing the rear seat back and the door in the sound board. Periodic inspection, and if necessary proper cleaning is recommended. The same cleaning and inspection should be done to the structure beneath the floor boards.

One of the most important of the many advantages of metal stressed skin construction is that a careful inspection of the outer surface will, in general, give a good indication of the condition of the structure. Fittings and attachments should of course be examined periodically on the inside, but the time involved will be negligible compared with the older type of wood or steel tube construction which has its structural members entirely covered and usually quite inaccessible due to fairings and fabric.

The wing tips are easily removable for inspection of the outboard wing structure and repair or replacement of the wing tips in case of accident. Their removal also provides access to the position light connections and wiring.

Either partial or complete removal of the engine cowl is a matter of a few moments, a screw driver or a coin being the only tool necessary.

The fabric covering on the rear section of the wings and on the tail surface may be cleaned using luke warm or cold water and Lux flakes or the equivalent. After cleaning, the surface should be rinsed with clear fresh water and dried with a chamois.

The Alclad aluminum alloy skin and other exposed bright metal may be polished if desired with a good metal polish.

General Maintenance con't.

The leather and upholstering material on the Ryan cabin airplane is of the finest quality flameproof material obtainable. Spots and stains may be removed with the use of any good grade of cleaning fluid.

Lubrication is of paramount importance not only in the satisfactory operation of any mechanism but it also largely determines the amount of satisfactory service the parts can render to the owner. The frequency of lubrication periods depends entirely upon operating and climatic conditions. Under average usage it is recommended that lubrication periods coincide with engine checks.

RUDDER PEDALS

The rudder pedals are mounted on aluminum alloy bearing blocks secured to the bottom web of bulkhead number one. Access to the bearings is provided for by removable socks secured to the floor at both right and left hand pedals. Periodic inspection and oiling will properly maintain this assembly. The right hand rudder pedals may be removed by taking out one bolt at the socket connection.

RUDDER CABLES

These cables are connected to the rudder pedal horns located midway between right and left pedals. Turnbuckles are provided on these horns and may be reached by removing the fire extinguisher bracket which is secured to the floor by means of two cowling studs and clips.

From the rudder pedal horns the control cables lead back through the tail going through the fuselage skin just forward of bulkhead nine and connect to the rudder horns. These cables are supported by two pulleys located under the wing connecting spar which forms part of bulkhead number two.

Non-flexible control cables are used from the rudder horns to a point just back of the support pulleys where they connect to extra flexible con-

Rudder Cables, con't.

trol cables. At the connection point of the cables straps are provided to prevent the cables from twisting under load. Access to these connections and to the pulleys is provided for by removal of the front seat cushions and raising the hinged center floor boards.

BRAKE CABLES

The brake cables are attached to the horns on the rudder pedals just below the rudder cable attachment. These lead back through a pulley box mounted under the wing connecting spar, out through the fuselage and into the wings just back of the spar. A pulley is bracketed to the wing spar just above the landing gear and from this point the cables lead down through traveling pulleys and connect to a bell crank actuating the brake lever arm on the wheel. The pulley box mounted on the connecting spar is adjustable for brake operation or parking by means of a hand operated brake lever conveniently located at the center and just forward of the front seats.

Access to the brake handle mechanism, pulley box and transverse pulleys is obtained by raising the hinged center floor boards under the seat as described above for the rudder cable connections. The wing pulleys and brackets may be inspected through the openings in the lower surface of the wings above the landing gear. The brake arms and bell cranks may be reached through the removable plates on the sides of the wheel pants.

BRAKES - CONTROL ADJUSTMENT

A turnbuckle is provided at each rudder horn near the rudder pedals for cable adjustment. These may be reached by removing the fire extinguisher bracket as outlined under rudder cables. Lengthening or shortening this turnbuckle provides the required brake control adjustment. The brake action

Brakes - Control Adjustment, con't.

and adjustment is independent of each other and permits the necessary flexibility of adjustment to suit the needs of each individual operator.

WHEELS, BRAKES AND TIRES

Brake discs should be adjusted by means of the lock nut so that a .015"-.020" feeler gauge can be inserted.

It is very important that the brake lever arm be in the full off position when the brakes are fully released and all brake adjustments must be made by adjusting the lock nut.

With the system working properly and excessive hand brake lever travel or lack of braking power result, it is probably due to wear in the discs and should be corrected by removing the wheel and turning up the lock nut until the .015"-.020" clearance is secured between the discs.

The only parts which should ever need replacement are the bronze and steel discs which may be secured from the Goodyear factory at Los Angeles, or at Akron, Ohio.

Proper inflation pressure of $17\frac{1}{2}$ is obtained when the rib on the shoulder of the tire is in contact with the ground with the ship fully loaded.

STICK CONTROL UNITS

The right hand control stick is removable from its socket by extracting one bolt. This stick socket and the left hand stick are mounted on a transverse torque tube which operates on bearing brackets welded to the wing connecting spar. A control horn is welded to the torque tube and transmits the fore and aft motion of the control sticks to the elevator cables. Stops are also provided on the control horns for proper adjustment of the elevator travel.

Stick Control Unite, con't.

Side movement of the sticks for aileron control is carried to a short torque tube connected to the left hand stick near the bottom through a universal joint. The torque tube extends back to a point just to the rear of the connecting spar and is supported by a large size bronze bearing bracketed to the spar. A control horn is bolted to the end of the torque tube for the connection of the aileron cables. Stick stops for proper aileron travel are provided for by adjustable bolts at the outer base of each control stick.

Access to the control stick mechanism may be obtained by removing the dust cover located just below and in front of the seats. This cover is secured to the floor by colwing clips and to the connecting spar by machine screws.

ELEVATOR CABLES

Extra flexible control cables connect to the control horn on the stick transverse torque tube and lead back and down to a double pulley unit secured to the bottom web of number three bulkhead. Just to the rear of this unit the flexible cables are connected to non-flexible control cables which carry back and connect to the elevator horns.

The top cable passes through the fuselage skin just forward of number eight bulkhead and then through a slot in the front fin bracket just below the horizontal stabilizer connection. It then attaches to the top elevator horns which provides both a cable and an inter-elevator connection. The bottom elevator cables goes through the skin just back of bulkhead number eight and through a passage provided for in the horizontal stabilizer rear bracket and connects to the lower elevator horns.

At the connecting point of the flexible and non-flexible control cables just back of bulkhead number three cable straps are provided to prevent the

Elevator Cables, con't.

cables from twisting under load. Access to these straps and to the cable connections may be had by removing the rear seat cushion.

Removal of either side of the fin fairing provides access to the cable connections at the elevator horns. Adjustment of the cables is obtained by the turnbuckles used as connectors at the transverse torque tube control horn.

AILERON CABLES

These control cables are of the non-flexible type throughout. They connect to the control horn described in the section under Stick Control Units and carry directly through the wing to the bell crank opposite the center of the aileron.

Adjustment of these cables is provided for by the turnbuckles acting as connectors at the bell crank. The aileron control cables should be kept tight at all times. Tighten each cable an equal amount when adjusting to prevent changing the differential action of the ailerons.

Access to the turnbuckles and bell crank connections is obtained by removal of the inspection plate located in the lower surface of each wing just forward of the center of the aileron.

The cable connections at the torque tube near the stick control unit may be inspected by removing the left half of the hinged floor board under the front seat.

AILERON CONTROL-WING

A bell crank mounted on brackets on the rear side of the spar transmits the movement of the aileron cables to a push-pull tube which is connected to the control horn on the aileron.

The bell crank is of exceptionally rugged construction and is mounted

Aileron Control-Wing, con't.

on a self-lubricated sealed ball bearing carried by the spar brackets. The push-pull tube incorporates universal ball joint fittings at either end for adjustment. The ball joint screws into tapped holes in the bell crank and in the control horn at the aileron where it is also locked by castellated nuts and cotter pins. Well adjustment and freedom from wear is amply provided for in this assembly.

Access to the bell crank and the push pull tube is provided for through the inspection plate described under the heading of Aileron Cables.

TAB CONTROL

The cabin portion of this unit is oiled and adjusted when installed at the factory and should not need further attention. It is mounted under the upholstery on the left side of the fuselage opposite the front seat with the placard and the crank handle projecting through for operation. This unit consists of two pulleys suitably mounted and having an endless tab control cable woven through them. One pulley is directly connected to the control crank and the other acts as a guide.

This endless cable travels back of the upholstery, bulkhead, through the fuselage skin just forward of bulkhead number eight, around a double pulley on the horizontal stabilizer rear spar and terminates at a pulley which is mounted in front of the elevator spar.

This pulley is rigidly mounted and forms an integral part of the tab push-pull tube adjusting screw. This screw is carried and its fore and aft movement restricted by a self aligning ball bearing mounted in an aluminum alloy block attached to the elevator spar. Travel of the cable imparts a rotary motion to the screw. The push-pull tube is internally threaded, acts as a nut and actuates the tab horn to which it is connected

by a small self-aligning ball bearing.

Access for cleaning or inspection of this unit is provided for by removing the small fairing secured to the upper surface of the left elevator spar.

Tension adjustment of the endless cable is obtained by adjusting the turnbuckle inside the fuselage at number six bulkhead.

TAB INDICATOR

This indicator is operated by a single cable connected to the tab push-pull tube and leads forward paralleling the tab adjusting cables, to a spring connection above the cabin tab control unit. Its reading is not effected by any slippage of the control crank or mechanism.

Calibration of the indicator is provided for by means of a slip lock which acts as a connector between the short cable leading from the elevator and the long cable through the fuselage. This connection may be inspected by removing either side of the top fin fairing.

HINGES

The hinges of the movable control surfaces are equipped with sealed lubricated ball bearings and should not require attention other than occasional dusting or wiping off for inspection purposes.

LANDING GEAR

Each landing gear leg is an assembly of three major assemblies, the wheel and brake assembly, wheel fork and shock strut assembly, and the wing support tube assembly.

Goodyear tires of the four ply Heavy Duty type are mounted on Goodyear hubs which incorporate internal disc type brakes. The hub revolves on two roller bearings, packed in grease, and mounts on an axle tube which extends

Landing Gear, con't.

past the hub on either side and is retained in position by bolted collars.

This assembly mounts between the two legs of the fork and a long nickle steel bolt passes through both the fork and the axle and is locked and keyed into place on either end. The torque plate is locked in place by a bolt through the inner end of the fork. This design incorporates positive rigidity of the axle and torque plate arm combined with simplicity and ease of removal for tire change.

The wheel fork is a welded assembly incorporating the inner and outer wheel fork legs for the wheel support and a vertical bearing tube which travels inside a large bronze bearing carried by the main support tube. The oleo shock absorber unit is permanently installed inside the wheel fork bearing tube with the upper portion of the oleo piston tube extending beyond the fork bearing tube. A bushing is inserted through and welded to the piston tube near the top as a means of retaining the piston when assembled to the wing support tube. A special sleeve type wrench is used for adjustment of the oleo packing gland as it is recessed within the wheel fork bearing tube.

The wing support tube is a welded assembly, heat treated for additional strength and is permanently fixed to the wing spar during assembly. A large bronze bearing is inserted in the end of the support tube and is locked into place by means of three short bolts. The wheel fork bearing tube with the oleo shock absorber installed is inserted into the support tube and connected with a large bolt located just below the lower surface of the wing nose cover. Near the bottom and at the rear of the support tube a double bracket is located which supports one side of a scissors unit. Similar brackets are located on the rear side of the wheel fork for the other scissors support. The scissors unit assures correct wheel alignment and also carries loads produced by side landings.

It is recommended that periodic servicing of this complete unit be made in the interests of long service and trouble free operation. There are no

Landing Gear, con't.

adjustments necessary with the exception of brake maintenance. Inspection plates are provided on the wheel fairings or they may be removed entirely in a few minutes if necessary. After flying from muddy fields, it is advisable to wash out the inside of the wheel fairings and recoil the moving parts.

TAIL WHEEL ASSEMBLY

This assembly consists of four units of rugged and compact design. It incorporates an oleo shock absorber with full swiveling wheel.

A Goodyear streamline tire and hub is mounted in the tail wheel fork by means of a nickel steel bolt locked in place with a castellated nut and key. Two bearings packed in grease and sealed against entrance of dirt permit free rotation of the wheel unit. The fork is carried by a support tube and is free to swivel 360 degrees. A double equalizer spring is used at the fork retainer cap for alignment but does not effect the operation or the movement of the fork. A bracket bolted to the outside of the skin at the bottom of bulkhead number eight provides a hinge for the forward end of the support tube. The rear end of this support tube is connected to the bottom of the oleo shock strut, while the upper end of the strut is bolted to a bracket at the top of bulkhead eight. All hinges have large bronze bearings and connections are made by nickel steel bolts and cotter pins.

Operating conditions will determine the cleaning and lubrication requirements. The shock strut should require little attention, fluid being added occasionally where extreme operating conditions make it necessary.

Access to the tail wheel fork and strut may be had by removing the handhole plate at the left side of the fuselage between bulkheads number eight and nine. Removal of the metal fairing streamline just above the wheel permits access to the support tube hinge and bracket. Proper tire

Tail Wheel Assembly, con't.

pressure under normal loads is 29 pounds.

WING FLAPS

The wing flap is located beneath the fuselage and almost directly below the front seats. It is carried by two hinge brackets welded to the wing connecting spar. The operating handle is located on the left side of the cabin just forward of the front seat. A trigger knob in the top of the handle operating in conjunction with a locking quadrant which is rigidly secured to the fuselage side structure permits locking of the flap in any one of several positions. This handle is hinged to a bracket on the wing connecting spar and transmits its movement to the flap by means of a universal connection and a short push-pull tube. Little maintenance other than periodic inspection will be required.

ELECTRICAL INSTALLATION-BATTERY

The battery is carried in a bracket mounted in the engine compartment. It is of the leakproof type, equipped with a master cover and is approved for installation without a box, drain or other acid proof container. A master switch is located close to the battery terminal on the right hand side of the engine mount and is operated from the instrument board by a button type Bowdenite control cable. The master switch is so connected to act as a positive cut off between the battery and all electrical units. It should be left in the off position at all times when the plane is not being flown or operated.

ELECTRICAL INSTALLATION (FUSES)

A fuse block is provided for protection of all lighting circuits and permits individual fusing of the landing light, position lights, cabin and instrument lights and radio.

Electrical Installation(Fuses), con't.

The fuse block is recessed in the instrument panel on the right hand side and is covered by a small hinged door which provides storage facilities for spare fuses by means of clips secured to its back side. This arrangement provides for quick replacement of fuses either on the ground or in the air. The fuses used in this airplane are of two sizes, 10 ampere and 15 ampere. Fuse blocks and fuses are marked and should be inserted in the proper place when replaced.

WIRING-AIRPLANE

A terminal block is located beneath the hinged right center floor board by means of a bracket riveted to the fuselage skin. This serves as a power distribution center for the landing lights, position lights, cabin dome light and radio. Control switches are located on the instrument board just to one side of the fuse door and control all light circuits except the dome light. This switch is located in the arm rest on the right side of the rear seat just back of the ash receiver.

The negative or ground cable from the battery connects to the engine, the engine mount, number one fuselage bulkhead and to one terminal of the above terminal block. The positive cable from the battery goes directly to the master switch while the other side of the master switch is connected to a cable which leads to one side of the fuse block. The other side of the fuse clips are individually connected by wires to the switches on the instrument panel and control their respective circuits.

Wires connected to the remaining terminals of the switches with the exception of the instrument board light wires run to the terminal block beneath the center floor board and connect there to the incoming wires from the lights in the wings, cabin and tail.

Wiring Airplane, con't.

All light circuits are return grounded by means of wires. The airplane structure is in no case utilized as a means of conducting electrical current and greatly minimizes the possibility of faulty connections, flickering lights and radio interference.

Cables and wires within the fuselage are protected by looms supported from the structure by clamps. Wires within the wings are carried in rubber grommets throughout.

No effort has been spared to make the entire electrical system trouble proof and to insure long, satisfactory service.

ELECTRICAL INSTALLATION-ENGINE

The master switch is connected to the solenoid by means of a cable. Another cable connects the solenoid to the starter and the solenoid third wire leads back to one side of the starter switch located on the left side of the instrument panel. From the other side of the starter switch a wire is connected to the fuse block.

IGNITION SYSTEM

Frequent inspection of all ignition and engine ground wires is necessary to assure that this system functions properly and that the engine may be stopped at any desired time. All switch connections should also be periodically inspected.

ENGINE INSTALLATION

Engine maintenance is completely covered in the engine manual furnished with the airplane. Engine attachment bolts should be tightened snugly and the fittings at the fuselage inspected regularly. The cowlings are designed to be easily and quickly removed and enables rapid inspection and ideal accessibility for maintenance.

FUEL SYSTEM

The gasoline tank is of welded sheet aluminum construction and is mounted by suspending it in large aluminum alloy straps riveted to the upper fuselage reinforcing members. Inspection will consist of examining these straps for tightness and to see that all felt chafing pads are in place.

A simple gravity feed fuel system is utilized eliminating the necessity of engine driven and hand wobble pumps.

The inspection of the fuel system should be as follows:

1. Strainer screen removed and cleaned once a week.
2. Carburetor screen removed and cleaned once a week.
3. A small amount of fuel should be drained from the strainer daily and checked for water in the gasoline.
4. Inspect all fuel lines, fuel hose, and clamps.
5. Inspect strainer attachment bolts for tightness and nuts safetied.
6. Strainer drain cock should be examined for tightness and safetied.
7. The gas shut off cocks and controls should be inspected for proper operation and leaks at the cocks.
8. Finger strainers provided in the fuel tank for the main and reserve lines should be removed and cleaned approximately every one hundred hours. This is done by draining the gasoline from the tank removing the fuel line hose and unscrewing the fuel cocks from the tank. Care should be taken in screwing the cocks back into the tank to see that the threads are properly started.

Fostoris Tightseal or an equivalent product applied to the joint before assembly will prevent leaking at this point. Assemble hose connections and fill tank. Check all connections and cocks for leaks.

The gas gauge is a direct reading float type and should give a minimum amount of trouble. It is readily removable by unscrewing the locknut on the tank and with-drawin~~e~~ the complete float and gauge unit.

OIL SYSTEM

The oil tank is also of welded sheet aluminum construction and is suspended in straps from the upper engine mount tubes. All oil lines, temperature

Oil System, con't.

and pressure lines should be inspected for tightness. The oil drain is located in the oil inlet line and is readily accessible for draining. Use the oil manufacturer's recommendation regarding oil changing. A dagger type gauge is riveted to the oil tank cap for determination of the quantity of oil in the tank.

THROTTLE CONTROL

Throttle controls should be oiled occasionally at the sliding member and at all joints. Proper friction may be adjusted by the knurled nut at the instrument board. Adjustments are provided at the throttle end at the carburetor. Periodic examination should be made to see that all bolts are tight and safetied.

SPARK AND MIXTURE CONTROLS

These controls are of the Bowdenite type and are located on the instrument board near the throttle. They may be oiled occasionally and checked for safety at the connections.

INSTRUMENTS

The flight instruments are located at the center of the instrument board and are mounted on Lord rubber mounts. Adequate damping of all vibrations is provided for with consequent freedom from instrument trouble. Engine instruments are located on the left hand side of the panel.

AIRPLANE STRUCTURE-FUSELAGE

The fuselage is made from a high finish Alclad aluminum alloy. Due to its construction and with normal usage this fuselage will be remarkably free from maintenance problems during the entire life of the plane. It will only be necessary to use ordinary care in handling the plane to avoid denting the skin and to prevent scratches in the material. Scratches re-

Airplane Structure-Fuselage, con't.

move the outside protective coat of pure aluminum and may cause corrosion or cracks. Periodic inspection should be made at rivets, skin joints and bulkheads. Proper alignment and connecting points are fixed at the factory on steel jigs, and in all ordinary service will not require attention.

The fuselage may be kept clean by washing with water and Oakite Aviation cleaner or an equivalent product. After cleaning, all parts should be carefully rinsed and allowed to dry thoroughly. If desired the fuselage may be polished with a good metal polish that is free from alkali and alrasive material.

The cowlings and parts of the fuselage and wing may occassionally become stained and discolored due to engine exhaust gases. These stains are easily removed in the same manner as outlined above. The cleaner may be purchased from the Oakite Products Co. with branches located in all principal cities.

WINGS

This unit embodies the most modern all metal construction of any commercial airplane. The single spar and torsion resisting nose cover offer the ultimate in lightness and yet assures tremendous strength and rigidity. The simple trussed and stamped trailing edge ribs, fabric covered, assure lightness and ease of inspection and maintenance. Inspection plates are provided where necessary in the lower surface of the wing. The detachable wing tip permits access to the outer portion of the wing and to the position lights and wiring. Tie down plates are located on the spar at the lower surface of the wing near the tip.

The wing is fabricated in steel jigs and proper alignment is absolutely assured. Adjustment in service is neither necessary nor desirable. Little maintenance can be required with this unit. Periodic inspection will consist

Wings, con't.

of examining the skin landing gear attachment, rivet connections, and the bolt connections at the fuselage. Large taper bolts are used for these connections and they should be inspected and checked for tightness. It is not advisable to tighten these bolts excessively. They should only be brought up to a snug fit. An 8 pound pull on an 18 inch arm will be sufficient to tighten the large bolts properly. A corresponding reduction is of course necessary when tightening the small taper bolt at the nose connection.

TAIL GROUP

Adjustment of this unit is not necessary as proper alignment has been made at the factory on assembly. The large streamline aluminum alloy tube connected to the lower rear spar of the stabilizer assures proper setting during service. Inspection will consist of periodic checking of bearings, bolts for tightness and safety and cables for tension and wear. The upper fin fillet may be easily removed for inspection of control horns, cables, bolts and fairleads.

GENERAL PROCEDURE FOR STARTING ENGINE

(See Engine Handbook)

1. Check gasoline supply.
2. Check oil supply.
3. Turn gasoline shut off valve to reserve position. (Note: The engine should be allowed to run taking fuel from the reserve line until the takeoff has been made and a safe altitude reached. The shut off valve may then be turned to use fuel from the main line.)
4. Set mixture control in full rich position.
5. Retard spark. (Best setting will be determined by experiment).
6. If engine has been standing for some time, turn the propeller over by hand at least two complete revolutions, with the ignition switch off.
7. Pump the throttle from two to six strokes depending on the particular weather conditions involved. If the engine is warm no pumping of

General Procedure for Starting Engine, con't.

the throttle will be required.

8. Turn magneto switch to "Both On" position.
9. Open the throttle 1/8 or less and press starter button.

SERVICING THE RYAN MODEL SC

20 HOURS

The following checks are recommended.

1. Inspect fuselage and fittings.
2. Inspect wing and tail surfaces.
3. Inspect and oil stick control and rudder pedal assembly.
4. Inspect tab controls and mechanism.
5. Inspect aileron control mechanism.
6. Check all control cables.
7. Oil tail wheel **post**.
8. Check landing gear.
9. Check engine installation.

40 HOURS

1. Repeat inspection and service of 20 hour check.
2. Check gas tank straps for tightness.
3. Check tail wheel shock absorber unit.
4. Check brake adjustment.

200 HOURS

1. Remove landing gear wheels and wash bearings. Repack bearing with a good grade of wheel bearing grease. Make certain that locking pin is removed from brake housing before driving out grease retainers.
2. Check shock strut oil. Replenish if necessary with "General Petroleum Grade G Shock Absorber Oil".
3. Grease tail wheel bearings, This will necessitate removing the bearings from the wheel. Wash, clean and pack with a good grade wheel bearing grease.

HEAT TREATMENT-STRUCTURE

The following steel parts and assemblies have been heat treated to an ultimate tensile strength of 180,000 pounds per square inch.

<u>Part Number</u>	<u>Item</u>
F-2039	Wing connecting spar
L-2031	Shock strut wing support tube
L-2041	Tail wheel fork
C-2010	Assembly left stick
C-2011	Aileron universal
C-2028	Right control stick
C-2029	Assembly right stick
C-2041	Brake ratchet

RYAN AIRCRAFT FACTORY

Instructions for Production of Stock Monoplanes.

In the construction of planes the material used may be considered as going through four stages, namely:

Raw Material
Parts
Units
Complete Planes

The labor necessary to construct the planes in the factory may be divided into three operations, namely:

Making raw material into parts.
Assembling parts into units.
Assembling units into complete planes.

All Raw Material is requisitioned from the outside by Purchase Orders, and upon being delivered to the factory must be checked through the main stock room. The man in charge of the main stock room is responsible for the receipt of all Raw Material and must turn in to the office either the Shipping Ticket which accompanies the goods, or in case there is no Shipping Ticket, a list of items, checked and signed by him.

All work done in the shop requires a work order. These order are issued from the factory office and must be signed to be effective.

Each work order issued will bear a number with a letter prefixed. These letters are significant of the unit or type of work which the order covers. All time slips and material requisitions applied to a work order must bear both the letter and number.

There are fifteen letters representing the fifteen distinctive units which are necessary for a complete plane. These letters are the first in the name of each unit. They are as follows:

W- Wing
A- Ailerons
F- Fuselage
U- Undercarriage
M- Motor Mount
E- Empennage
T- Tail Skid
L- Lift Strut
C- Controls
G- Gas Tank
O- Oil Tank
R- Radiator
I- Instrument Board
S- Seats
P- Power Plant

In addition to these units there are several more letters representing the following:

K- Kindred Accessories. These include several small metal, wood, and cloth parts which are hardly distinctive of any unit, and which are listed elsewhere.

- J- Joint Assembly. This includes all final assembly of planes. More definite information about this is given in the following paragraph:
- X- Extra Equipment. This includes all items added to planes which are not stock production and for which an extra charge is made.
- Y- Field Order. All work done in tuning up motors and repairing and testing planes after leaving the factory and before delivery must be charged to an order bearing this letter.
- Z- Plane Repairs. All repair work done on Monoplanes which have been sold shall be charged to an order bearing this letter.
- Q- Shop Upkeep. Each month a standing order bearing this letter shall be issued to cover all upkeep of shop equipment.

On a separate record there is listed the material necessary for the construction of a monoplane itemized by units. Work order will first be issued for one or more sets of each kind of parts where it is necessary that these be made up before assembly into the complete units.

Orders will then be issued for one or more units to be assembled from these parts. In each case the unit should be assembled as complete as possible before being put into the plane final assembly.

On the plane final assembly orders all units will be joined together to make up the complete plane.

All material and parts must be requisitioned by the department heads. It shall be the duty of the department heads to have the material ready for his men when needed, and they shall not be allowed to draw material or parts except on requisitions signed by the department head. In case of absence of the department head some other man in the department shall be delegated as acting head.

In drawing raw material from the stock room for parts, the complete amount of all items necessary to fill the order must be drawn at once. In case there is not sufficient material on hand to fill the order, notation must be made on the requisition to that effect. All requisitions for material for parts should agree with the accompanying record. In case any discrepancy is found in this record it should be reported immediately to the office and corrections of the record made. In the case of special jobs not requiring the standard amount of material, the requisition should be marked to that effect.

In drawing parts for the assembly of units no raw material should be drawn except that listed under one Complete Set Assembly parts for that unit. All other material should be requisitioned as parts and

should be drawn in complete sets, not individual parts. For instance:
In assembling a wing the requisition should read as follows:

Work Order # W-

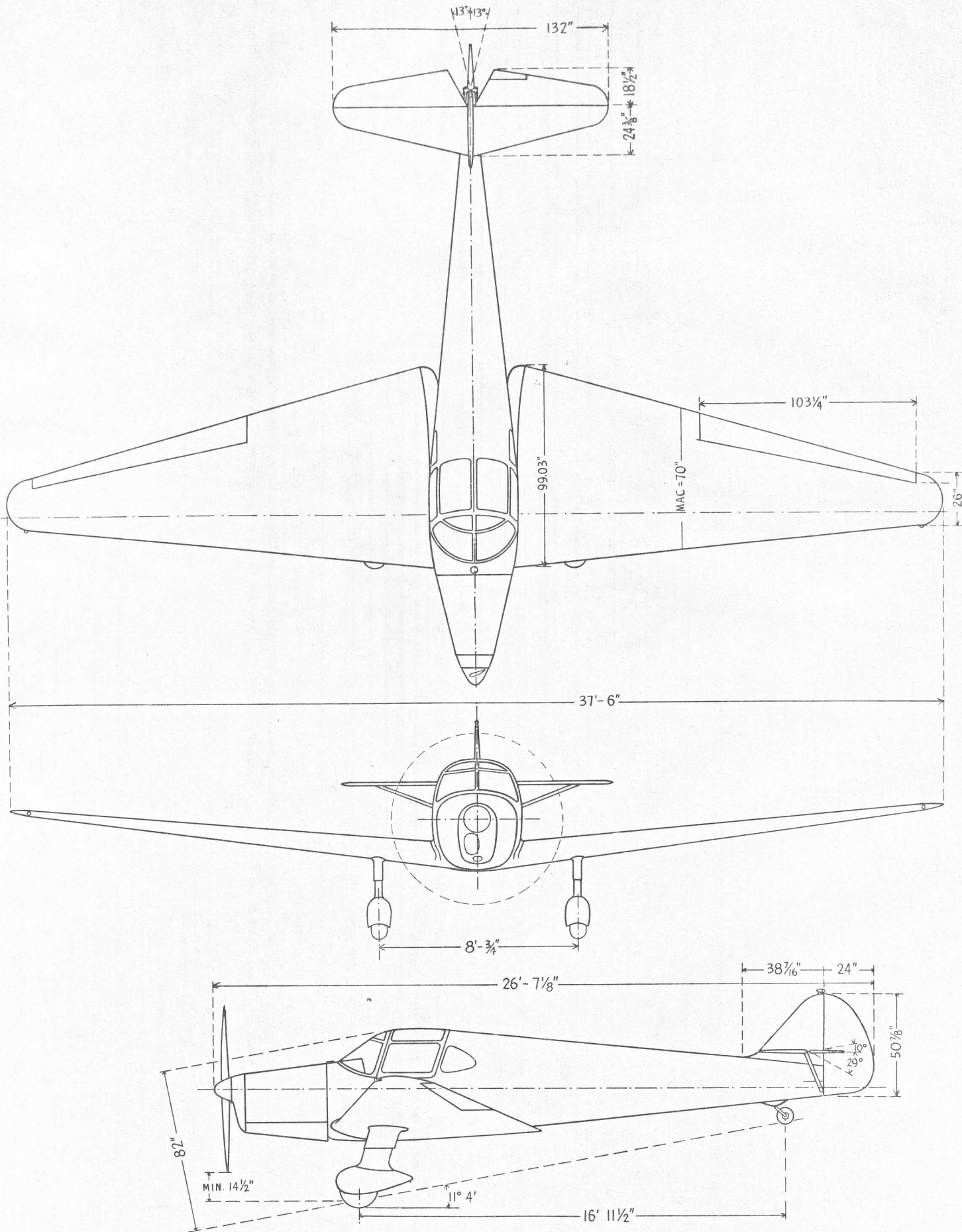
- 1 Complete Set Ribs
- 1 Complete Set Spars
- 1 Complete Set Wood Edge & Brace Strips
- 1 Complete Set Wires
- 1 Complete Set Fittings
- 1 Aluminum Cover Plate
- 1 Complete Set Assembly Parts

Under the order for Assembly Parts should be listed the items shown on the material record.

All raw material used in making up the other sets should have been requisitioned previously on the parts orders and should not be listed again.

On the final assembly, or J, order the units used should be requisitioned as such. Absolutely no material should be drawn on this order except the assembly parts shown on the record. These should be drawn in groups for the various units and not separately.

In every case where material is drawn for extra or outside jobs notation must be made on the requisition to that effect.



Special Instruction

FOLLOW INSTRUCTIONS CAREFULLY TO REASSEMBLE RIGHT BRAKE CABLE & AILERON CABLES

Remove front floor mat and fire extinguisher bracket, then take control stick housing out. Release front half of rear floor boards.

Bring brake cable into fuselage through lower hole with aileron cable.

Disconnect pulley housing & disassemble pulleys.

Run cable through right hand pulley and connect to turn-buckle at rudder control.

Replace pulley in housing, then assemble pulley housing to main bulkhead

Connect aileron cables to aileron torque tube - top & bottom.

Adjust turnbuckles and bolt floor boards in place.

Replace control stick housing and bolt seats in place.

Dis-assembly Procedure on Ryan SC Cabin Plane

1. Remove Cowling
2. Disconnect Spark Plugs
3. Drain Gas
4. Drain Oil
5. Remove Propeller & Grease Shaft
6. Remove Spark Plugs
7. Spray inside cylinder with anti-rust
8. Battery - place in wooden box.
9. Remove flaps
10. Remove walkway mat
11. Remove wing fairing front & rear
12. Remove wheel pants upper & lower
13. Disconnect brake cable (see special insts)
14. Disconnect Aileron Cables
15. Disconnect air speed tubes
16. Disconnect light wires
17. Place horses under connecting spar in fuselage saddle under tail - be sure to weight down tail so as to prevent nose-over
18. Unsafety wire bolts, be sure to mark bolt and position with center punch so they will be replaced in same hole. This is necessary because they are a taper pin and the holes are taper fit. Drive out bolts with soft mallet or wood block against bolts to prevent marring threads. Remove wing and place nose down on sand bags or like material on floor.
19. Remove landing gear from wing by removing main bolt at top of support tube on wing. The landing gear will then slip out intact. Place small box (bout 8" deep) under support tube and wing will balance safely by itself.
20. Remove inspection plate on fuselage at tail end
21. Remove upper and lower fin fairings and front fairing
22. Disconnect cables at rudder horn and remove rudder, replacing hinge bolts in rudder hinge immediately.
23. Disconnect elevator cables and tab control cable. Remove elevator and replace hinge bolts immediately.
24. Disconnect stabilizer struts, remove and disconnect front stabilizer spar at support bracket and remove
25. Clean up parts if necessary
26. Tag all parts plainly
27. Wrap all parts with wrapping paper.
28. Secure in box with fittings provided
29. All small bolts & screws to be put in paper bags, tagged and tied to the part to which they belong.

1. Fuselage - Complete

- a. Motor Cowl
- b. Sliding hatch complete in place
- c. Fin mounted in place
- d. Seats & Cushions complete
- e. Carpets - complete
- f. Fire extinguisher in place
- g. Travelkit
- h. Hatch keys
- i. Ash-tray installed
- j. Hatch curtain installed
- k. Instruments

6. One Flap or Air Brake
with hinge fairing in place

7. One Battery

8. One Box with:
Engine Tool Kit
Instruction Manual - Engine
Log Book
Manual - Plane
14 spark plugs

2. Wings Complete

- a. Right & Left Wings
- b. Right & Left Aileron attached
- c. Right & Left Wing Tips in place
- d. Running Lights Mounted
- e. Landing Lights Mounted - if specified
- f. Tie-down Fitting Mounted
- g. Landing Gear Support Tube Built In
- h. Wing Walk Mats & Screws
- i.
 - 1. one L & R wing fairing - rear
 - 2. one L & R wing fairing - front
 - 3. one L & R upper wheel pant
 - 4. one L & R lower wheel pant
- j. Air Speed Pitot Tube
- k. Wing Bolts - four 3/4" taper
two 5/16 taper

3. Empennage

- a. Rudder with hinge bolts in place
- b. L & R Elevator, hinges & bolts in place
- c. L & R Stabilizer
- d. L & R Stabilizer Struts attached
- e. Fairing
 - one L & R Fin - lower
 - one L & R Fin - upper
 - one Fin - front
- f. One set nuts and bolts for fin fairing

4. Landing Gear

- a. R & L Landing Gear
- b. Brake Trombone
- c. Brake Cable
- d. Scissors
- e. Wheels complete
- f. Bolts & Nuts

5. One Propeller with Hub (no spinner)